International Journal of Epidemiology

Vol. 24, No. 1
Printed in Great Britain

Nutritional Change and Economic Crisis in an Urban Congolese Community

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Background. In 1986, the government of Congo undertook a structural adjustment programme to cope with the economic crisis. We present the results of a study whose objectives were to assess the evolution of nutritional status of an urban community between 1986 and 1991 and to identify specific groups for which the nutritional status may have worsened.

Methods. Two cross-sectional surveys were carried out on representative samples of Brazzaville children <6 years old: 2295 children were surveyed in 1986 and 2373 in 1991. Anthropometric assessment of nutritional status was performed. For children, weight-for-height and height-for-age indices were used according to WHO recommendations. Wasting and stunting were respectively defined as indices under –2 z-scores. Body mass index of mothers was calculated and risk of chronic energy deficiency (CED) was defined as <18.5 kg/m^2. Socioeconomic data relative to the households were also collected. Multivariate statistical methods were used to obtain adjusted estimates of nutritional changes in the community.

Results. Data analysis led to several converging results: increase in the percentage of low birthweight (10.2% in 1985 versus 18.7% in 1990), increase in the percentage of CED (from 7.9% to 10.5%), and increase in the prevalence of wasting (from 2.9% to 4.2%). By contrast, the overall prevalence of stunting decreased from 13.9% to 11.0%. After statistical adjustment, the factors found to influence the evolution of anthropometric status were: age of child, age of mother, schooling of mother and household characteristics such as number of preschool children, economic level and head of household's occupation.

Conclusions. The study enables the negative effects of the economic crisis to be quantified. Body mass index is shown to be sensitive to economic changes. It could be recommended as a possible indicator for monitoring the nutritional status at population level. The results also call for a new impetus in preventive health programmes and the implementation of nutritional surveillance activities.

At the beginning of the 1980s, the economies of the sub-Saharan nations were battered by a series of shocks of external origin, linked to the second oil price increase and the resulting recession among the industrialized countries. These external pressures had an immediate negative impact on inflation, national budget deficits and liquidity for most of sub-Saharan Africa.

At the beginning, when these macro-economic problems were only perceived as symptoms of a cash-flow crisis due to a temporary tightening of commercial terms, many nations implemented stabilization programmes with the backing of the IMF. Later, when it became apparent that the roots of the economic crisis went much deeper, these efforts at stabilization were complemented by structural adjustment programmes. Both the economic crisis and the stabilization and adjustment measures had noticeable repercussions on economic growth, employment and income for African households, with consequences on the availability and consumption of food products. This was particularly acute in urban communities. These measures also had a negative impact on budget allocations for essential social services.

In the absence of nutritional surveillance activities which might have documented the true evolution of the situation, attempts at producing models to assess the potential effect of adjustment were made, based on available and localized data. Thus, in the Ivory Coast, it appeared that a decrease in the availability and the quality of health care would be likely to have a negative effect, particularly on children's linear growth. The increase in the price of foodstuffs would adversely

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N.B. Sadly Dr André Cornu has died since this paper was written.

affect the children's weight-for-height index, and the body mass index of adults.[1] Furthermore, a review of the available nutritional data for Africa points to a deterioration in nutritional status during the 1980s.[2,3] No study, so far, has accurately documented the evolution of a nutritional situation in the specific context of a structural adjustment plan.

Until the mid-1980s, the Congo enjoyed a period of economic expansion: oil revenues made up a large portion of the GNP and the latter topped the US$ 1000 per capita mark, making this country a relatively prosperous member of the region. This heavy reliance on the oil sector backfired when, beginning in 1983, the price of crude oil started to drop. The Congo's GNP fell by nearly 40% between 1983 and 1986. The burden of servicing the national debt led the government to adopt a structural adjustment plan in 1986. The plan resulted in a sharp increase in unemployment—from 20% to 30%—and in massive cuts in the health care and education budgets.[3] In the Congo, more than half the population lives in two large cities (Pointe-Noire and the capital city Brazzaville) and so it was particularly important to try to assess the effect of the economic crisis and the adjustment on the nutritional status in the urban environment.

A nutritional survey was carried out in Brazzaville in 1986, based on a representative sample of children <6 years of age and their mothers.[4,5] Because it provided basic data immediately prior to the implementation of the adjustment plan, this study offered the opportunity to measure the evolution of the nutritional status of an urban community. Thus, a new survey was conducted in 1991 by the same team using the same sampling procedure. The main objective of this study was to assess the overall change in nutritional status. It also aimed at identifying population groups at risk, in order to help implement specific assistance measures if needed.

METHODS

Sample Selection

A sampling base had been established in 1986, based on a list of city blocks and data from the most recent population census.[6] Clusters of identical size were selected by random sampling. The number of clusters was chosen to provide a minimum of 100 children per quarterly age group, i.e. 2400 children <6 years. The number of mothers in the sample was dependent on the number of children. The 1991 survey was carried out in the same city blocks as the 1986 study, and at the same time of year (February–March).

The survey was done in three phases. In the first phase, an exhaustive list of households was made. In the second phase, on the following day, the actual data collection took place. In order to minimize the number of missing subjects, a third phase was carried out, aimed at capturing the subjects missed during the second phase. In 1986, fewer mothers were investigated as the conditions of the survey did not allow the investigators to return to the homes and thereby include the women who had been absent initially. However, the overall socioeconomic characteristics of the mothers' households were the same for both studies.

Data Collection and Nutritional Indices

Socioeconomic data pertaining to the family and the household were collected: size of the household, characteristics of the dwelling, ownership of appliances, age, parents' and head of household's profession and level of schooling and so on.

Anthropometric measurements were taken according to standardized procedures, to ensure accuracy and reproducibility.[7] Weights of children <16 kg were measured on baby scales (accuracy of ± 20 g). Calibrated electronic scales were used for mothers and children >16 kg (accuracy of ± 200 g). For children <24 months, length was measured (to the nearest mm) while lying down, with a portable measuring board. For older children and mothers, stature was measured while standing (also to the nearest mm), with a stadiometer.

For children, according to WHO recommendations, the weight-for-height and height-for-age indices are presented as deviation in z-scores from the CDC/WHO reference population mean value.[8–10] Wasting and stunting are respectively defined as weight-for-height and height-for-age <–2 z-scores. Moderate wasting is defined as weight-for-height <–1 z-score.

Body mass index (BMI) or Quetelet index (weight/height^2) was used to assess the nutritional status of non-pregnant mothers. The risk of chronic energy deficiency (CED) was defined as BMI <18.5 kg/m^2, and overweight (including obesity) as BMI ≥25 kg/m^2.[11]

Birthweight was checked from the records (health-book or record card) whenever possible. In the analysis, only verified birthweights were taken into account. Low birthweight was defined as <2500 g.

Data Processing and Statistical Analysis

EpiInfo software, on a PC, was used for data entry and storage and for computing anthropometric indices.[12] Data management and statistical analyses were performed using the SAS system, release 6.07, for Unix.[13]

Data of a purely economic nature, such as type of dwelling, access to water and electricity, goods and possessions, were summarized in a single economic scale: the first principal component of the correspondence

TABLE 1 *Preschool children weight-for-height and height-for-age distributions 1986–1991*

Survey	(n)	Weight-for height[a]					Height-for-age[a]				
		<–3.0 %	–3.0/–2.1 %	–2.0/–1.1 %	⩾–1.0 %	P^b	<–3.0 %	–3.0/–2.1 %	–2.0/–1.1 %	⩾–1.0 %	P
1986	(2288)	0.5	2.4	18.6	78.5	0.005	3.7	10.2	26.9	59.2	0.0001
1991	(2334)	1.1	3.1	21.0	74.8		3.7	7.3	24.3	64.7	

[a] Nutritional indices expressed in z-score.
[b] χ^2 test.

analysis performed on the indicator matrix coding the socioeconomic variables. This scale was then divided into three classes of equal frequencies, representing increasing levels of wealth.

A multiple effects analysis of variance,[14] in which the index was the dependent variable, was performed for each of the continuous indices, weight-for-height, height-for-age and BMI. Logistic regression[15,16] was used to deal with dichotomous indicators such as wasting, moderate wasting, stunting and CED. In both types of analysis, the model included the year of survey, age of children and mother, economic level of household, education of mother, etc., as main effects, as well as the interaction terms between these variables and the year of survey. The significance of the interaction terms was assessed in order to identify the characteristics which might be associated with a possible worsening or improvement in the nutritional status between 1986 and 1991. Such a variable is commonly called an effect modifier.[17]

RESULTS

General Characteristics of the Samples

In 1986, 2295 children <6 years were included in the sample (50.2% boys and 49.8% girls). The size of the associated sample of mothers was 1610 women (1.4 children per mother). The mean age of mothers was 27.5 ± 0.2 years (n = 1088), 3.0% were <18. Their mean weight was 58.0 ± 0.4 kg (n = 947), and their mean height was 159.4 ± 0.2 cm.

In 1991, the sample of preschool children included 2373 children (50.1% boys and 49.9% girls). In all, 1512 mothers were surveyed (1.4 children per mother). The mean age of the mothers was 28.8 ± 0.3 years (n = 1512), 6.5% were <18. Their mean weight was 59.4 ± 0.3 kg (n = 1350), and their mean height was 160.0 ± 0.2 cm.

There was no significant difference between 1986 and 1991 in the age distribution of the children (χ^2 test, 5 df, $P = 0.12$). These similar distributions of age enabled overall comparisons between 1986 and 1991, despite the well-known disjunction at 2 years of age in the growth reference curves.[10]

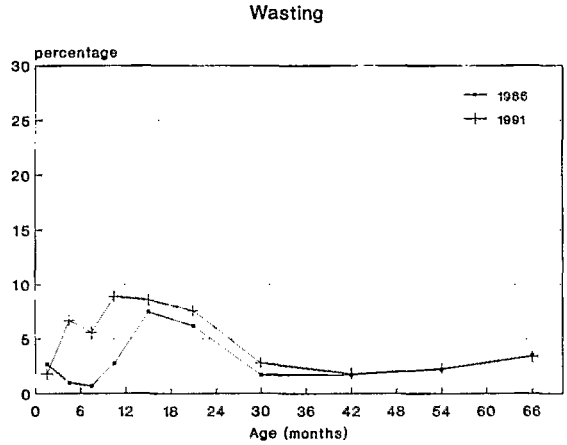
Evolution of the Children's Nutritional Status

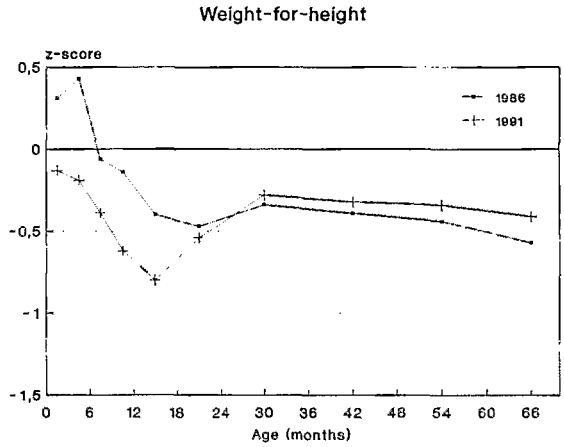
The overall percentage of wasting was higher in 1991 (4.2%) than in 1986 (2.9%), while the prevalence of stunting improved from 13.9% in 1986 to 11.3% in 1991 (Table 1). The mean weight-for-height decreased from –0.30 z-scores ± 0.02 to –0.39 ± 0.02, while the mean height-for-age increased from –0.80 ± 0.03 to –0.56 ± 0.03. The evolution of weight-for-height and height-for-age indices did not differ according to gender.

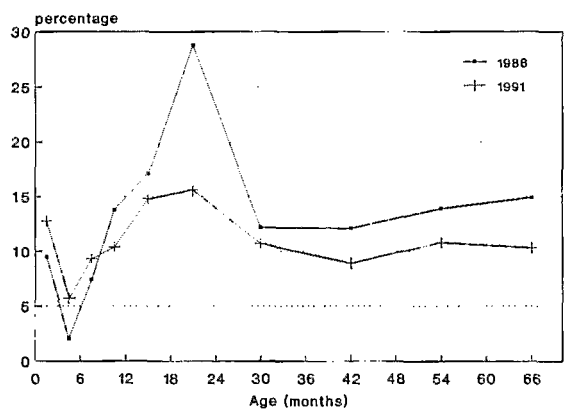
This evolution appears to be closely linked to age of children. The increase in the prevalence of wasting was noticeably higher among children <1 year old: from 2.1% to 5.7% (Figure 1). Similarly, the evolution of mean weight-for-height between 1986 and 1991 depends on the age group (Figure 2): a marked decrease among the <1 year olds (from +0.08 to –0.34, $P < 0.001$), a moderate decrease among the 1–2 year olds (–0.44 to –0.67, $P < 0.01$) and a slight increase among those >2 years old (–0.44 to –0.33, $P = 0.02$). As for stunting, beyond 9 months, the 1991 percentages are always less than those for 1986. This is especially acute in the 18–24 month age group where the prevalence peak of 1986 flattens: from 28.8% to 15.6% (Figure 1). The same pattern of change can be observed for the height-for-age mean values.

Evolution of the Nutritional Status of the Mothers

The percentage of mothers whose BMI is considered normal (18.5 ⩽BMI < 25 kg/m^2) went down from 67.3% to 60.8% between 1986 and 1991 (Table 2). Conversely, an increase is observed both in the CED (7.9% to 10.5%) and in the overweight (24.9% to 28.8%) categories. Consequently, the mean BMI remained stable (22.8 ± 0.1 in 1986, 23.1 ± 0.1 in 1991).







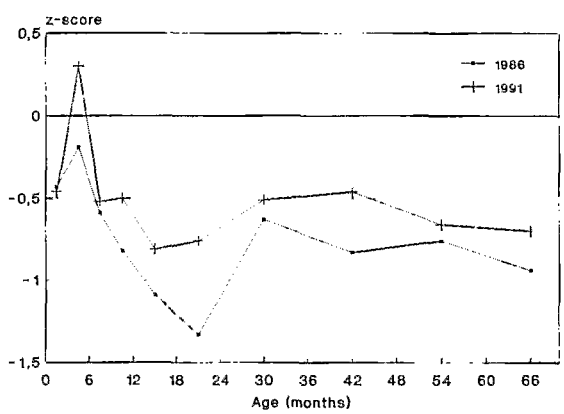


FIGURE 1 *Prevalences of wasting and stunting by age, 1986–1991*

FIGURE 2 *Mean values of weight-for-height and height-for-age by age, 1986–1991*

TABLE 2 *Mother's body mass index (BMI) distributions, 1986–1991*

		BMI categories (kg/m²)							
Survey	(n)	<16 %	16–16.9 %	17–18.4 %	18.5–19.9 %	20–24.9 %	25.0–29.9 %	≥30 %	P^a
1986	(947)	0.5	1.7	5.7	16.2	51.1	18.5	6.3	0.037
1991	(1350)	0.8	1.9	7.8	14.4	46.4	20.7	8.1	

[a] χ^2 test.

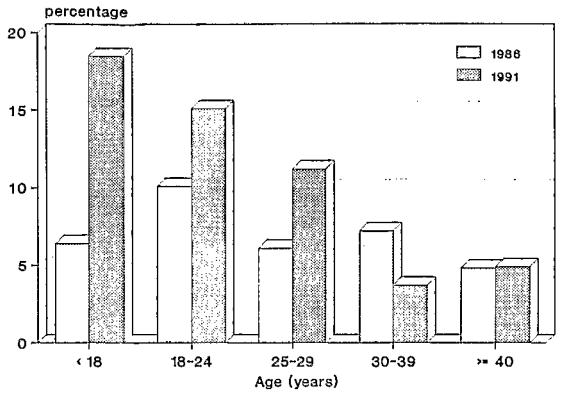


FIGURE 3 *Prevalences of chronic energy deficiency in mothers by age, 1986–1991*

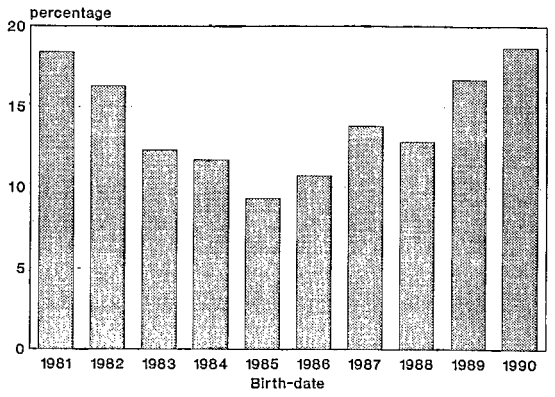


FIGURE 4 *Prevalences of low birthweights, 1981–1990*

From 1986 to 1991, the prevalence of CED (Figure 3) increased for all age groups <30 (the overall percentage in that group went up from 8.2% to 13.8%). It decreased among mothers ⩾30 (6.7% to 3.9%).

Evolution of Low Birthweights

The percentage of low birthweights had decreased steadily between 1981 and 1985 (Figure 4), from 18.4% down to 10.2% ($P = 0.003$ trend χ^2 test). In contrast, between 1986 and 1990 this percentage increased regularly, from 10.7% to 18.7% ($P = 0.0001$). The pattern of change in the annual average birthweights corroborates this trend. The lowest value of the decade was observed in 1990 (2954 g, n = 331).

Variables for which the 1986 to 1991 Evolution Differs from One Category to Another (Effect Modifiers)

Such a variable is one whose interaction term with year of survey, in the analysis of variance and/or logistic regression model, is significant.

Weight-for-height indices. Analysis of variance and logistic regression with respectively, weight-for-height and moderate wasting as the dependent variable were performed. Both identify age of the child as a modifier (Table 3). The main feature is a decrease in the mean values of weight-for-height among the youngest. These means decrease from +0.09 to –0.27 z-scores between 0 and 11 months, and from –0.45 to –0.73 between 12 and 23 months. As for moderate wasting, the odds ratios are also >1 for these two age groups (Table 3). Head of household's occupation and number of children <6 in the household also seem to influence the trend in weight-for-height, though less significantly (Table 3).

Height-for-age indices. Analysis of variance pinpoints the schooling level of the mother, the economic level of the household and, to a lesser degree, the number of preschool children living in the household as modifiers (Table 3).

In 1991 the mean height-for-age improved among the children whose mothers have had higher education, going from –0.54 to –0.17 z-scores. The improvement is less pronounced in children whose mothers did not go beyond primary education: from –0.86 to –0.78 z-scores. Among children from the most economically deprived households, the situation remained unchanged: from –0.85 in 1986 to –0.84 in 1991. The improvement was the most significant (from –0.92 to –0.57) for the intermediate economic level.

Body mass index of mothers. The analysis pointed to two variables (Table 3): schooling level (for the analysis of variance model) and age of the mother (logistic regression). The pattern of change of the average BMI is not a straightforward function of the level of education (Table 3): among mothers with no schooling at all, the mean value drops from 24.1 kg/m^2 to 23.3, for mothers with a primary school level of education, it increases from 22.6 to 23.5. On the contrary, the odds ratio of being at risk of CED in 1991 compared to 1986 decreases steadily with age (Table 3). The information conveyed by these adjusted odds ratios is coherent with the raw data displayed in Figure 4.

Analysis of Wasting Among the Youngest Children

There is a deterioration in the nutritional status of the youngest children from 1986 to 1991. According to the results in Table 4, there seems to be a close correlation between the prevalence of emaciation among the young children, the percentage of low birthweight and the prevalence of CED mothers. This simultaneous negative evolution is particularly obvious among the children <12 months, whose mothers are <30: in this group,

TABLE 3 *Variables for which the 1986 to 1991 anthropometric evolution differs from one category to another*

Variables	Multiple effect analysis of variance Differences between 1991 and 1986 mean values (1991 mean value)	Logistic regression Odds ratio of malnutrition in 1991 compared to 1986
	Weight-for-height (in z-score)	Moderate wasting
Age of child ($P = 0.001$)		Age of child ($P < 0.001$)
0–11	−0.36 (−0.27)	2.45 (1.56–3.84)
12–23	−0.28 (−0.73)	1.83 (1.21–2.70)
24–71	+0.09 (−0.35)	0.81 (0.58–1.13)
Number of preschool children in household ($P = 0.04$)		
1	+0.03 (−0.26)	
2	−0.19 (−0.48)	
3+	−0.08 (−0.42)	
Head of household's occupation ($P = 0.05$)		
Trained personnel	−0.16 (−0.38)	
Artisan/merchant	0.00 (−0.41)	
Employee	0.00 (−0.32)	
Worker	+0.01 (−0.40)	
No occupation	−0.26 (−0.47)	
	Height-for-age (in z-score)	Stunting
Schooling of mother ($P = 0.003$)		
No schooling	+0.13 (−0.73)	
Primary	+0.07 (−0.78)	no variable was identified
Secondary	+0.17 (−0.53)	as an effect modifier
Higher education	+0.28 (−0.17)	
Economic level of household ($P = 0.019$)		
Low	0.00 (−0.84)	
Middle	+0.36 (−0.57)	
High	+0.07 (−0.29)	
Number of preschool children in household ($P = 0.037$)		
1	+0.05 (−0.57)	
2	+0.29 (−0.47)	
3+	+0.18 (−0.64)	
	Mother's BMI[a] (in kg/m^2)	Mother's CED[b]
Schooling of mother ($P = 0.03$)		Age of mother (years) ($P = 0.05$)
No schooling	−0.75 (23.32)	<20 2.34 (0.69–7.90)
Primary	+0.91 (23.48)	20–29 2.07 (1.32–3.22)
Secondary	−0.01 (22.49)	≥30 0.62 (0.33–1.16)
Higher education	+0.83 (24.08)	

[a] Body mass index.
[b] Chronic energy deficiency.

between 1986 and 1991, the prevalence of wasting increased fivefold, that of CED doubled and the percentage of low birthweight tripled. A similar, though less pronounced evolution took place among children in the 12–23 month age group and whose mothers are <30.

The weight-for-height index for the children <24 months surveyed in 1991 was used as the response variable in regression and analysis of variance models. The independent variables were: sex, birthweight, BMI and height of mother, age of mother at time of birth and economic level of the household. In the regression model, the variables such as age and birthweight were entered without any prior coding. In the ANOVA model the values of the dependent variables were grouped in classes. In both models, birthweight ($P < 0.0001$ and $P < 0.01$) and BMI of mother ($P < 0.001$ and $P < 0.0001$) seem to be significantly related to weight-for-height according to the trend described above (positive correlation).

A logistic regression was also performed with wasting as the response and the same dependent variables. This model corroborates the link between wasting and mother's BMI. It also identifies the age of the mother at

TABLE 4 *Prevalences of wasting in children, of chronic energy deficiency (CED) in mothers and of low birthweight, 1986–1991, by ages of children and of mothers*

Age of children (months)	Age of mothers (years)	Survey	Wasting		CED		Low birthweight	
			%	(n)	%	(n)	%	(n)
0–11	<30	1986	1.6	(315)	6.7	(299)	7.7	(222)
		1991	7.3	(330)	12.8	(335)	22.1	(231)
	⩾30	1986	2.0	(102)	4.2	(95)	11.1	(81)
		1991	1.8	(113)	3.4	(116)	14.6	(82)
12–23	<30	1986	6.4	(219)	10.6	(180)	11.5	(165)
		1991	9.4	(298)	16.3	(270)	18.0	(206)
	⩾30	1986	7.3	(82)	11.9	(67)	7.5	(53)
		1991	4.2	(96)	4.5	(89)	14.8	(54)

time of birth as being significantly related to wasting: the risk of experiencing wasting before the age of 2 is three times greater for a child whose mother was <30 at time of delivery.

DISCUSSION

Over the 1986–1991 period, all the nutritional indicators but one, followed the same trend. The prevalence of low birthweight, the percentage of CED among mothers and the percentage of wasting among children <1 year increased. The only indicator which does not fit this pattern is the prevalence of stunting, which underwent a paradoxical decline.

Weight-for-height and Wasting in Children

The hypotheses that can be put forward to explain the increase in the number of emaciated children are: growing food insecurity, changes in morbidity, and the deterioration of the quality of the mother/child relationship.

The characteristics of the diet of these young children were described in the 1991 survey. This had not been done in 1986, and comparisons cannot be made. However, other data, relative to the entire household and whose analysis is not completed yet, should enable us to assess the weight of food insecurity versus that of inadequate practices.

The prevalence of morbidity at time of survey among children <1 year old is high but not very different (32% in 1986 versus 39% in 1991). The distributions of illnesses (declared by mothers and not confirmed by any clinical examination) are also very similar in the two surveys. This refutes the hypothesis of a major outbreak of infectious diseases, just before or during the 1991 survey, to explain the increased prevalence of wasting.

However, in 1991 (compared to 1986) there has been a deterioration of environmental conditions: some districts of the survey area have become totally unsanitary. This is a consequence of the economic crisis, and the resulting lack of collection and disposal of all types of waste, as well as basic road maintenance and drainage provision.

Moreover, bottle feeding has become more frequent: in 1991, 19% of infants <18 months were bottle-fed, 17% of children <3 months were fed this way, and this percentage was the same up to the age of 23 months (unpublished observations).

At the same time, one of the consequences of the crisis is a reduced access to drugs and medicines through public facilities. Other studies have shown that acute and chronic forms of malnutrition could be linked to the accessibility of health care: the 1990 study carried out in Ivory Coast emphasized the importance of programmes aimed at controlling malaria and dysentery. Their positive effect on the incidence of emaciation was also stated.[18]

In economically deprived urban environments, young mothers take part in the family strategies aimed at attempting to provide the indispensable minimum income. For the child, the consequence is a decline in the amount of care and developmental stimuli. The mother spends most of her time in casual work and thus neglects the educational programmes provided by the MCH (Mother and Child Health) centres. This results in a lack of awareness of the child's most fundamental needs.

Birthweight

The analysis of the percentage of low birthweights suffers from the low number of useable subjects, since only children whose actual birthweight could be reliably verified were considered. This made it difficult to refine the analysis by adding certain variables (birth order, socioeconomic level). Nevertheless the manner in which the data were collected and verified goes some way to guaranteeing the validity of the observed trend (a steady

increase of the prevalence of low birthweight from 1986 to 1991).

In order to confirm this result, a specific study was carried out in five maternity wards in Brazzaville. For the area of the survey and for the period 1985–1991, 41 058 birthweights were retrieved. A global analysis confirms the trend and displays an increase in the prevalence of low birthweights at the end of the 1980s: 10.0% in 1985 (n = 3180) and 13.9% in 1991 (n = 8439). If only primiparae are considered, the trend is the same: 15.0% in 1995 (n = 734) versus 20.6% in 1991 (n = 2294). The increase is much less obvious among multiparous women for whom the prevalence stays close to 10%. Thus, this second study confirms the trend of increasing prevalence of low birthweights, and shows that babies of young mothers are at the highest risk.

Finally, it can be noted that the evolution of the prevalence of low birthweight in Brazzaville during the 1980s is the reverse of that of the GDP of the Congo for the same period: between 1980 and 1985, the GDP rose form 225 billion CFA Francs to 972 billion; by 1989, it had dropped back to 680 billion.[3]

Body Mass Index of Mothers

The nutritional status of the mothers deteriorated over a span of 5 years. On the one hand, this takes the form of an increase in the percentage of overweight or obese mothers. This phenomenon of nutritional transition is common to communities undergoing urbanization.[19] and periods of economic crisis do not necessarily rule out the spread of non-communicable diseases. Nevertheless, one would expect the prevalence of obesity to be tempered by the economic situation. On the other hand, the deterioration of nutritional status is also evident in the increase in the percentage of mothers suffering from CED. The <30 group is particularly affected, with mothers <18, whose proportion in the survey sample had increased by 1991, being the most at risk. Furthermore, it was shown that there was a strong link between the children's weight-for-height index and the mother's BMI.[20]

Height-for-age and Stunting in Children

Without any other indicator, the decrease in the linear growth retardation might have led us to believe that the welfare of preschool children had improved from 1986 to 1991.

Nevertheless, there was no increase in the height of children belonging to households of the lowest economic terciles. At the same time, a sharp increase took place in the group of children from the middle economic level households, which probably suffered less from the economic crisis. There was a moderate increase in the higher economic level group of children, probably because the mean height-for-age value was already much higher in 1986 (–0.35) in this group, than in the two other groups (–0.85 and –0.93). These comments suggest that the negative effects of the economic crisis were felt differently according to the economic level of the population groups.

In the 1986 survey, the prevalence of stunting among the 18-month age group is unusually high. As no bias could be identified, this high figure must be considered valid. It is worth commenting upon the reduced prevalence in the 1991 survey, despite the fact that all other nutritional parameters in the community had deteriorated. This could be partly linked to a marked decrease in the incidence of measles in Brazzaville. Data supplied by the 'Service des Grandes Endémies' (an epidemiology department) indicate that for children <8 months, the rate dropped from 93 per 1000 in 1984 to 0.1 in 1989. Among the 9–23 month old group the rate went from 41 per 1000 in 1985 to 19.8 in 1990. On the contrary, the analysis of the weekly prevalence of diarrhoea does not indicate any significant improvement in the situation from 1986 to 1991.

Moreover, it cannot be ruled out that the decrease in prevalence of stunting may result from an increase in the mortality rate, especially among children born between March and August 1989 (i.e. those 18–23 months old when the 1991 survey took place). We could neither confirm nor refute this hypothesis since the appropriate demographic data were not available. Another possible explanation for the decrease in stunting is that linear growth retardation takes a much longer time to appear compared to wasting. According to that hypothesis, if the negative effects of the adjustment programme continue, a few years later the prevalence of both stunting and wasting will be likely to increase.

Risk Factors

The risk factors that were identified did not allow us to target the population groups very accurately for which special social assistance measures should be considered. This is particularly true for wasting among preschool children, for whom the risk is more linked to age than to any socioeconomic criteria: those most at risk are the youngest children and the children of the youngest mothers. As for CED, those most at risk are the youngest mothers, those who lack schooling, and those living in the most economically deprived households.[21]

Relevance of Anthropometric Indicators

The results presented above seem to indicate that the prevalence of CED among mothers, and of low

birthweights might constitute two especially useful indicators when assessing the effect of the recession and of the adjustment policies.

Women play a major role in securing the household's food supply and in intra-household food distribution. They are among the first to feel the consequences of a decrease in a family's food resources:[22] the decrease in the food supply usually results in an increase in physical activity, even during pregnancy. The economic crisis affecting the Congo also resulted in a lowering of the quality of health services available to pregnant women; the negative effect on birthweight cannot be ignored. In a crisis situation, the nutritional status of both mothers and infants is all the more precarious as the mothers do not profit from the new family strategies.

The discussion above demonstrates the need to monitor the evolution of the nutritional status through other indicators in addition to the anthropometric characteristics of preschool children.

CONCLUSION

The study shows that the structural adjustment programme to deal with macro-economic imbalances implemented in the Congo was unable to avoid the degradation of the overall nutritional status. The first generation of these programmes failed to pay sufficient attention to the social impact of the economic measures taken.

It appears essential that certain health care services be given a new impetus. For mothers, a method for targeting women potentially at risk at the time of the first antenatal medical visit should be considered; this should take into account the woman's age and her level of schooling. As far as children are concerned, the increase in the prevalence of acute malnutrition among the <1 year olds appears high enough to justify public health measures. Due to the lack of clear determinants, the first type of action to consider would be stepping up growth monitoring promotion activities in the MCH centres. Taking appropriate measures, where wasting has been spotted, would probably be effective as almost all the children in Brazzaville attend MCH centres during their first 3 months of life.

Direct nutritional interventions would be essential among the high-risk groups of both children and their mothers. The close relationship that exists between well integrated health care centres and the communities must be put to use for the targeting of health and nutrition actions, and the choice of the forms these actions should take.

Finally, with the implementation of nutritional surveillance activities, it could be possible to keep track of the evolution of the nutritional status, to determine whether the trends observed are temporary or durable, to assess the effect of the various policies adopted, and to improve the quality of decision making.

ACKNOWLEDGEMENTS

We acknowledge M E Gruenais, M Lallemant, M Bonnefond and L Bérard for participating in the surveys, and the Chiefs of maternity wards in Brazzaville (Bacongo, Makélékélé, service des Armées, CHU, Blanche Gomez) for giving access to registers of births. Supported in part by ORSTOM, CEE (convention 228) and INSERM (convention 331) for 1986 survey and by ORSTOM and UNICEF-Brazzaville for 1991 survey.

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(Revised version received May 1994)